

NABIR RELATED

NABIR Data and Information Management System (NADIMS)

Pam Sydelko¹ and Arie Shoshani²

¹Argonne National Laboratory, Argonne, Ill.; ²Lawrence Berkeley National Laboratory, Berkeley, Calif.

The NABIR Data and Information Management System (NADIMS) is designed to provide cost-effective sharing of data among the NABIR investigators. NADIMS has been developed with input by NABIR researchers, science team leaders and NABIR program managers. The web-based object-oriented structure of NADIMS is modular, flexible and expandable. NADIMS reflects the interdisciplinary nature of the NABIR program and provides functionality to enable NABIR researchers to:

- browse and query "metadata"—information about datasets, projects, NABIR PIs and publications;
- search the metadata by microbes, biochemicals, field sites, rock materials, measurement methods, etc.;
- display, query and navigate spatial data representing NABIR field research sites;
- retrieve data from the NADIMS data repository in multiple formats (i.e., tables, graphics and text);
- perform spreadsheet and charting functions on tabular data retrieved from the repository.

NADIMS is organized into two components; one component manages the metadata (developed at Lawrence Berkeley National Laboratory), and the other manages the spatial organization of the datasets and the datasets content, usually represented as spreadsheets (developed at Argonne National Laboratory). Recently, the two components supporting the metadata and the actual datasets have been linked. One can browse the datasets based on spatial navigation and link to the metadata about a dataset of interest. Conversely, one can start by searching the metadata and link to the actual datasets.

Over the last year several datasets derived from sampling at the Gunnison and Shiprock UMTRA sites were entered to the database and are now on line. More datasets will be added, especially from the Field Research Center (FRC). Because many of the datasets collected by NABIR researchers are associated with field sites and are inherently locational, NADIMS was developed to include a map-based query system. Users can get to datasets by clicking on-line maps. In addition to the metadata associated with specific datasets, the metadatabase was also enriched by indexing numerous progress reports and publications relevant to NABIR.

NADIMS is an evolving system based on NABIR community needs. The current version of NADIMS is available now through the Web. The entry point to the metadata is: <http://gizmo.lbl.gov/NADIMS/metadata.html> and the entry point to the spatial search and datasets content is: <http://nabir.dis.anl.gov> (a password is required; contact Terry Hazen, (510)486-6223, TCHazen@lbl.gov, to receive password approval).

Proposed NABIR Field Research Center at Oak Ridge, Tennessee

David Watson

Oak Ridge National Laboratory, Oak Ridge, Tenn.

The Environmental Sciences Division at Oak Ridge National Laboratory (ORNL) proposes to establish a Field Research Center (FRC) on DOE's Oak Ridge Reservation (ORR) in Tennessee for the DOE Office of Biological and Environmental Research. The proposed FRC would provide a site for NABIR investigators to conduct research and obtain samples related to in situ bioremediation.

The proposed FRC would include a contaminated area to be used for conducting experiments on a plume of contaminated groundwater, a background area that would provide for comparison studies in an uncontaminated area, and ancillary structures that would be located within a 3.2-mile (5.2-km) radius of each other on the ORR. The contaminated and background areas would be located on DOE land in Bear Creek Valley, which is within the Y-12 Plant area. Both of these sites are well characterized, well instrumented and should be available for the duration of the proposed NABIR FRC (5 to 10 years). The water table resides at 0 to 3 m below the surface and would be readily accessible to the rapid instrumentation of multilevel groundwater monitoring wells. ORNL's unique track-mounted pneumatic hammer has the capability of installing drive-point wells deep within the unconsolidated zone and transition zone and offers an effective and cheap alternative to traditional drilling technologies.

The proposed FRC contaminated field site would include the co-mingled groundwater plume found in the shallow unconsolidated sediments (<10 m depth), Nolichucky Shale and Maynardville Limestone that originated from a combination of the S-3 Waste Disposal Ponds and the Bone Yard/Burn Yard. However, the primary focus of NABIR investigations would be on the easily accessible shallow unconsolidated sediments that overlie the Nolichucky Shale. Contaminants in this plume and in the shallow saturated and unsaturated soils include uranium, Tc-99, strontium metal, nitrate, barium, cadmium, volatile organic contaminants (VOCs) and other inorganics and radionuclides believed to be of interest to the NABIR investigators.

Injection of non-toxic tracers into groundwater has been conducted as part of numerous research projects on the ORR and does not require any state permits. Based on recent discussions with the state of Tennessee, injection of indigenous and non-indigenous naturally occurring bacteria should be possible at the proposed FRC. ORNL staff have experience with hydrocarbons, methane, air, nutrients, gases, volatile acids, various ionic and inert tracers, and microbial injections into the subsurface either on the ORR or in nearby environments. The adjacent soil lysimeters (OBER-funded research) would also be available to NABIR researchers for bioaugmentation, biostimulation and other studies.